

COMPONENTS

FAQ

Q How do Nvidia's Stream Processors differ from pixel pipelines?

A Traditional graphics cards have lots of pixel shaders, which generate realistic-looking textures and surfaces on a pixel-by-pixel basis by applying effects such as light refraction and reflection. The aim is to produce materials that react in the same way onscreen as they do in real life.

Nvidia's stream processors are part of the company's unified architecture and can be assigned a job dynamically depending on the scene. For indoor scenes, the stream processors can be used as pixel shaders; for outdoors, most can be used as vertex shaders. In all scenes, a graphics card with stream processors can generate very fast graphics.

Stream Processors can also be assigned other roles, such as physics calculations, giving programmers a flexible architecture to create their games as they see fit.

David Ludlow
Deputy Editor



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ASUS EN8800GTS

★★★★★

£300 inc VAT



Last month we reviewed Nvidia's new high-end graphics card, the GeForce 8800 GTX. It's expensive, costing more than £450 including VAT, but incredibly powerful and the first graphics card to support Microsoft's DirectX 10. This month, we look at the lower-specification Asus EN8800GTS, which uses the GeForce 8800 GTS graphics chip.

While this card might not have the stunning specifications of its big brother, it's far from low end. The 640MB of GDDR3 memory, down from 768MB on the 8800 GTX, is still more than on any graphics card from ATI. It's clocked at 800MHz (1.6GHz effective) and has a 320-bit memory interface, so bandwidth is no problem. The core speed is 500MHz, 75MHz less than on the 8800 GTX, but this figure is not so important. It's the number of stream processors and their clock speed that govern how quickly the graphics card can output graphics. The EN8800GTS has 96 stream processors running at 1.2GHz, while the 8800 GTX had 128 processors running at 1.35GHz.

The stream processors are different to the standard pixel pipelines that other graphics cards have, as they are flexible in their usage. For example, in indoor scenes most of them can be set as shaders, so the scene looks detailed; step outside, and most of the stream processors can be put into drawing geometry, so the outside looks more realistic and detailed. According to Nvidia, the stream processors can be used for other jobs, too, such as physics calculations to make games more realistic.

Performance is stunning. The scores in our standard tests are



brilliant and not far off those achieved by the 8800 GTX. This card is designed for high-resolution gaming, though, so we also ran the tests at 1,600x1,200. The scores weren't as good as for the 8800 GTX, but there's nothing to be worried about. With 49.7fps in Call of Duty 2 and 84.7fps in Doom 3, this is the second-fastest graphics card we have ever reviewed. There's the usual range of outputs, too, with two DVI and one TV out (S-video and component). The card has HDCP support, so it will be able to play protected content when it's available.

There are some potential problems, though. While the card requires only a single PCI-E power adaptor – the 8800 GTX needs two – it's still very big and takes up two slots. The large cooling fan isn't particularly quiet, either, so it's no good if you want to build a silent computer.

Still, the EN8800GTS is very quick at all resolutions and is much better value than the £450-plus 8800 GTX. As it's DirectX 10-compatible, it will definitely be able to play all new games and use all their new features, so it's a great buy. However, if you're on a tight budget Gigabyte's GV-RX195P256D-RH, which we review opposite, is less than half the price. While it's only DirectX 9c compatible, it's unlikely we'll see any DirectX 10-only games for at least the next year.

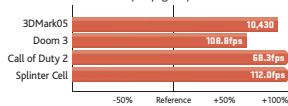
David Ludlow

SUMMARY

- ✓ Very fast
- ✓ DirectX 10 compatible
- ✗ Expensive

GRAPHICS CARD Nvidia GeForce 8800 GTS, 500MHz core speed, 96 stream processors running at 1.2GHz, 640MB GDDR 3 memory running at 800MHz (1.6GHz effective), PCI-E x16, two DVI, TV out
PART CODE EN8800GTS/HTDP/640M/A
SUPPLIER www.europc.co.uk
DETAILS http://uk.asus.com

PERFORMANCE (see page 56)



Also consider...

INTEL Core 2 Duo E6700

★★★★★

£343 inc VAT



Intel's new processor is based on the company's mobile technology. It is designed to be much more efficient than the P4. It's incredibly quick, achieving some of the highest benchmark results we've ever seen. You'll need a new Intel 965 or 975-based motherboard to use the E6700, but it's worth every penny, as it's by far the best-value processor you can buy.



PROCESSOR Two cores running at 2.66GHz, LGA775, 267MHz external bus, 4MB L2 cache
PART CODE BX805576700
SUPPLIER www.dabs.com
DETAILS www.intel.com

✓ Extremely fast, Great value FULL REVIEW Oct 2006

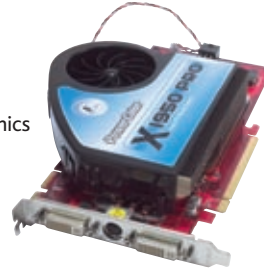
POWERCOLOR X1950 Pro

★★★★★

£153 inc VAT



PowerColor's X1950 Pro uses ATI's latest graphics chip and manages near-X1900 XT performance for almost half the price. Managing 50.6fps in our Call of Duty 2 test, this is a great card that will cope with modern games. If you want fast games on a reasonable budget, it is an excellent card.



GRAPHICS CARD ATI Radeon X1950 Pro, PCI-E x16 interface, 36 pixel pipelines, 256MB GDDR3 memory running at 700MHz (1.4GHz effective), 600MHz core speed, two DVI, TV out
PART CODE X1950PRO 256MB VIVO
SUPPLIER www.overclockers.co.uk
DETAILS www.powercolor.com.tw
✓ Incredibly quick; excellent value FULL REVIEW Feb 2007

GIGABYTE GV-RX195P256D-RH

★★★★★

£137 inc VAT



This is Gigabyte's graphics card based on ATI's good-value X1950 Pro chip.

The biggest innovation is that Gigabyte has used Zalman's VF700 silent cooler. The large heatsink and fan mean you'll need two free slots in your PC's case, so it's not suitable for small computers, but it is silent. It's less bulky than PowerColor's X1950 Pro, which uses a huge Artic Cooling fan that bulges out the side of the card. Otherwise, it's business as usual. The card has the same 600MHz core speed and 256MB of GDDR3 memory running at 700MHz (1.4GHz effective), 600MHz core speed and 256MB of GDDR3 memory running at 700MHz (1.4GHz effective) as PowerColor's card. It also has 36 pixel pipelines.

Performance was similar, too, although the GV-RX195P256D-RH was slightly quicker in every

test except Doom 3. While we test at a resolution of 1,280x1,024 we also increased our Call of Duty test to 1,600x1,200. Its score of 36.6fps is excellent. Should you want even more performance in the future, you can add a second X1950 Pro in CrossFire mode. The card uses the new internal CrossFire connector, so you don't need the untidy mess of cables hanging out the back of your PC or a master card, as with the older version of this technology.

The GV-RX195P256D-RH is available for just £137 including VAT, almost £20 cheaper than PowerColor's card. If you want high-end gaming but don't have a lot of money, this graphics card is remarkable value.

David Ludlow

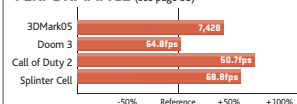


SUMMARY

- ✓ Excellent performance
- ✓ Silent
- ✗ Fan is quite bulky

GRAPHICS CARD ATI Radeon X1950 Pro, PCI-E x16 interface, 36 pixel pipelines, 256MB GDDR3 memory running at 700MHz (1.4GHz effective), 600MHz core speed, two DVI, TV out
PART CODE GV-RX195P256D-RH
SUPPLIER www.lambdatek.com
DETAILS www.gigabyte.com.tw

PERFORMANCE (see page 56)



LEADTEK WinFast PX8800 GTX TDH

★★★★★

£460 inc VAT

Leadtek's WinFast PX8800 GTX TDH is the second card we've seen to use Nvidia's high-end DirectX 10-compatible GeForce 8800 GTX graphics chip.

The 128 stream processors running at 1.35GHz and 768MB of GDDR3 memory running at 900MHz (1.8GHz effective) make this, on paper, the fastest graphics card you can buy. Performance is extremely good. Pushing the settings up to 1,600x1,200, we managed to get a stunning 69.3fps out of Call of Duty 2 and 110.35fps out of Doom 3. Quite simply, this graphics card can cope with any game and resolution at which you'd care to run it.

As with Foxconn's 8800 GTX, the WinFast PX8800 GTX TDH is very large and takes up two slots. It requires two PCI-E power adaptors to be plugged in; if

you want to run two of these cards in SLI mode, you'll need four connectors to power them both. There are two DVI and one TV-out (S-video and component) outputs. The digital outputs are HDCP-compliant, so you'll be able to watch protected HD content when it becomes available.

The Winfast PX8800 GTX TDH is very expensive. If you want the fastest graphics, and to be able to run DirectX 10 games, this is a great choice. However, Asus's GeForce 8800 GTS (see opposite) is £160 cheaper, incredibly quick in games and DirectX 10 compatible. If you're on a tight budget, Gigabyte's GV-RX195P256D-RH, above, is an excellent DirectX 9c graphics card that will be fine for at least the next year.

David Ludlow

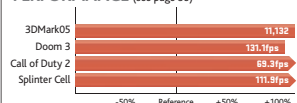


SUMMARY

- ✓ Extremely fast
- ✓ DirectX 10 compatible
- ✗ Expensive

GRAPHICS CARD Nvidia GeForce 8800 GTX, 575MHz core speed, 128 stream processors running at 1.35GHz, 768MB GDDR3 memory running at 900MHz (1.8GHz effective), PCI-E x16, two DVI, TV out
PART CODE PX8800GTX-TDH768
SUPPLIER www.ebuyer.com
DETAILS www.leadtek.com

PERFORMANCE (see page 56)



ANTEC P150

★★★★★

£102 inc VAT



Antec's iPod-white steel P150 case looks great on the desk and is built to keep your PC silent. It doesn't rattle, it has acoustic insulation and the hard disks screw into rubber grommets to prevent vibrations echoing through the P150. A silent Antec Neo HE 430W modular power supply is also included, all of which makes this case excellent value.



SILENT PC CASE ATX case, 120mm fan, two USB2, one FireWire, two audio ports, two 5¼" drive bays, one external 3½" drive bay, four internal 3½" drive bays PART CODE 0761345-019151-0 SUPPLIER www.morecomputers.com
DETAILS www.antec.com ✓ Attractive; comes with power supply ✗ Drive bays hard to access FULL REVIEW Mar 2006

ECS GeForce 6100SM-M

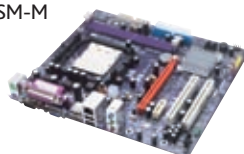
★★★★★

£40 inc VAT



ECS's GeForce 6100SM-M has onboard graphics, so it's perfect for building a PC on a budget if games aren't important. It's also microATX sized, so it will fit in a small case.

The GeForce 6100SM-M performed well in our benchmarks. It's a bargain if you want to build a budget AM2 PC.



AMD MOTHERBOARD Socket AM2, Nvidia GeForce 6100S chipset, 2x DDR2 slots, 1x PCI-E x16 slot, 1x PCI-E x1, 2x PCI, 1x IDE port, 2x SATA II ports PART CODE 1493-0120 SUPPLIER www.pcnextday.co.uk DETAILS www.ecs.com.tw
✓ Cheap; good 2D and 3D performance ✗ PCI-E x16 slot runs at x8 speed FULL REVIEW Jan 2007

MSI P965 Platinum

★★★★★

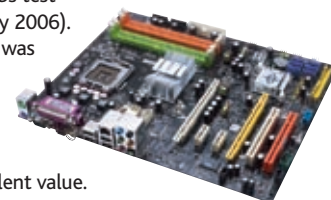
£102 inc VAT



If you want to build a Core 2 Duo PC, this motherboard is an excellent choice and was the cheapest to do so in our motherboard Labs test (Shopper January 2006).

Its performance was excellent in all our tests.

Considering the features it has, this is excellent value.

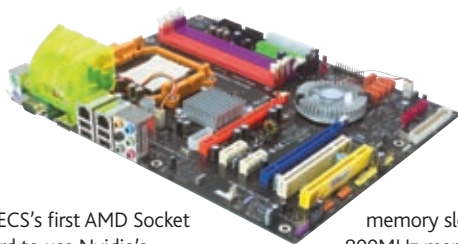


INTEL MOTHERBOARD Socket LGA775, Intel P965 chipset, four DDR2 slots, two PCI-E x16 slots, two PCI-E x1 slots, one IDE port, seven SATA2 ports PART CODE P965-Platinum SUPPLIER www.komplett.co.uk DETAILS www.msi.com.tw
✓ Good value; comprehensive BIOS FULL REVIEW Jan 2007

ECS KN3 SLI2

★★★★★

£94 inc VAT



The KN3 SLI2 is ECS's first AMD Socket AM2 motherboard to use Nvidia's Nforce 590 SLI chipset; the Intel version of this motherboard is also reviewed below. The 590 is Nvidia's top-of-the-range chipset and supports DualNet, for combining the two Gigabit Ethernet ports into one fast pipe, and Max Overclocking BIOS controls so you can adjust your processor and memory speeds. ECS provides the board with its Top-Hat Flash chip, which lets you recover your BIOS if you've pushed your overclocking too far.

As the high-end SLI chipset, both PCI-E x16 slots run at the full x16 speed; the cheaper 570 chipset runs the slots at x8 speed when using two graphics cards. In between the two graphics card slots are two PCI-E x1 slots, which will be blocked if you install two graphics cards. Fortunately, there are two PCI slots and four USB2 ports. There's no FireWire, but ECS provides these ports on a blanking plate so you can use the motherboard headers. The motherboard supports all AMD's Socket AM2 processors. It has four DDR2

memory slots that can take DDR2-800MHz memory. They're colour coded, so it's easy to use both memory channels for better performance.

Building a PC using this motherboard is generally easy, but the 24-pin ATX connector sits directly in front of the first IDE connector, so connecting an optical drive can be a bit fiddly. The KN3 SLI2 has two fans on the board, one hidden behind ECS's trademark luminous green shield. Fortunately, they're not too loud and just add

to the background noise of a typical PC. There's plenty of room for storage, with six SATA 300 ports. There's also an external SATA connector for a high-speed connection to an external hard disk.

Performance was excellent using an Athlon 64 FX-62 processor and 1GB of DDR2 800MHz memory. Its score was 14 points higher than Foxconn's WinFast N570SM2AA Nforce 570-based motherboard. Considering its low price, the KN3 SLI2 is a bargain AM2 SLI motherboard.

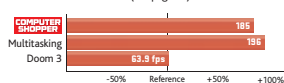
David Ludlow

SUMMARY

- ✓ Excellent performance
- ✓ Cables and connectors included
- ✗ ATX connection can be fiddly

AMD MOTHERBOARD Nvidia nForce 590 chipset, supports AMD Socket AM2 processors, two PCI, two PCI-E x1, two PCI-E x16 slots, four DIMM slots, two Gigabit Ethernet, Four USB2, eSata port
PART CODE KN3 SLI2
SUPPLIER www.pcnextday.co.uk
DETAILS www.ecs.com.tw

PERFORMANCE (see page 56)



ECS PN1 SLI2 Extreme

★★★★★

£112 inc VAT



ECS's PN1 SLI2 motherboard uses Nvidia's top-of-the-range Nforce 590 SLI chipset. It's also the Intel equivalent of the company's excellent AMD-based KN3 SLI2 motherboard, reviewed above. It's the first Nvidia-based motherboard we've reviewed to support Intel's Core 2 Duo range of processors.

The board's range of features is similar to those found on the AMD motherboard.

There's support for Nvidia's DualNet, so you can combine the two Gigabit Ethernet ports into one pipe, and Max Overclocking, so you can overclock your processor and memory. As with the AMD motherboard, ECS's Top-Hat Flash lets you recover the BIOS if you push your settings too far. There are two cooling fans to keep the board cool, which add to system noise.

The PN1 SLI2 has plenty of room for expansion. In addition to the dual PCI-E x16 slots, which run at full speed, there are two PCI slots, two PCI-E x1 and one PCI-E x4 slots. The motherboard's back panel is very busy, with four



USB2, dual Gigabit Ethernet and 7.1 audio outputs. More interesting is the FireWire 800 port, which you can use with external hard disks to get really fast throughputs. This is the first motherboard we've seen to use one. There's no eSATA port, but ECS provides an adaptor in the box that screws into a blanking

plate slot on your case and converts one of the six SATA2 ports into an eSATA connection. The box also contains extra USB2 and FireWire ports to connect to the spare headers.

Performance from our 3.6GHz Pentium 4 processor was very good. The PN1 SLI2 is one of the best-performing Intel motherboards we've seen. It's a little more expensive than the AMD equivalent, but a lot of extras are included in the box. If you're after a fast-performing Intel motherboard that has SLI support, the PN1 SLI2 from ECS is well worth the money.

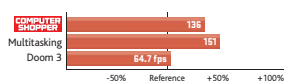
David Ludlow

SUMMARY

- ✓ Very quick
- ✓ Lots of ports and connectors
- ✗ Two cooling fans increase noise

INTEL MOTHERBOARD Nvidia nForce 590 chipset, supports Intel LGA775 processors, two PCI, two PCI-E x1, PCI-E x4, two PCI-E x16 slots, four DIMM slots, two Gigabit Ethernet, Four USB2, FireWire, FireWire 800 ports, 7.1 analogue, optical and coaxial S/PDIF outputs
PART CODE PN1 SLI2
SUPPLIER www.pcnextday.co.uk
DETAILS www.ecs.com.tw

PERFORMANCE (see page 56)



CHOOSING A... Barebones System

Follow the steps to find your ideal specs

PROCESSOR SUPPORT: AMD Socket AM2

HARD DISK SUPPORT: 2 SATA

EXPANSION SLOTS: 2 PCI

GRAPHICS: Onboard

EXTRAS: Memory card reader

Recommended minimum in grey

1 Buying a barebones system is a simple way of building your own computer, as you get a case with the motherboard already installed, plus all of the cables and instructions are designed specifically for your PC. All you need to do is add your own drives, processor, memory and, potentially, graphics card. A barebones system that supports the latest AMD Socket AM2 processors and has space for up to two hard disks and an optical drive will cost around £130.

2 As the motherboard is built in, you need to decide on the processor you want to buy before you choose your barebones case. If you want Intel support, you'll need an LGA775 socket. Check for Core 2 Duo support on the manufacturer's website if you want to use Intel's latest processors. For AMD systems, Socket 939 will support the older range of processors, which are good value now but harder to upgrade from; Socket AM2 will support all AMD's new processors.

3 If you just want a basic computer for office tasks, onboard graphics will save you money. If you want the option to upgrade to a dedicated graphics card to play games, look for a system that comes with a PCI-E x16 slot.

4 If you want to be able to install a wireless card, TV card or other expansion card, you'll need a system with free expansion slots. For now, make sure you get at least one PCI slot; PCI-E x1 slots aren't as well supported and you'll have more trouble buying a card to fit them.

5 How are you going to use your PC? If it's a second PC, a standard tower barebones will do the job. If space is at a premium, a mini PC is a more sensible option. If you're building for the living room, a barebones with hi-fi styling makes more sense. Whatever your choice, make sure there's enough room to fit all the hard disks, optical drives and expansion cards you want.